

IN THE CLAIMS:

Please cancel claims 1-34 without prejudice or disclaimer, and substitute new claims 35-67 therefor as follows:

Claims 1-34 (Cancelled).

35. (New) An optical signal polarisation control method, comprising the steps of:

feeding an optical input signal to a first polarisation transformation block for providing a corresponding first optical output signal;

feeding the first optical output signal to a second polarisation transformation block for providing a corresponding second output signal; and

providing to said blocks regulating signals variable within limited operating intervals and such as to permit said blocks to assume the following alternative configurations:

at least one configuration wherein one block between the first and the second blocks assumes an active state in which said configuration performs a polarisation transformation that is variable over time, and the other block assumes an inactive state in which said configuration carries out a polarisation transformation that is substantially constant over time, or

at least one additional configuration wherein one block between the first and the second blocks is in the active state and the other block is in a reset state in order to carry out a rewind operation wherein at least one of the corresponding regulating signals is made to assume a value within the corresponding limited interval.

36. (New) The method according to claim 35, wherein:

said at least one configuration comprises the following alternative configurations:
a first configuration, wherein the first block assumes the active state and the second block assumes the inactive state, and a second configuration, wherein the first block assumes the inactive state and the second block assumes the active state;

said at least one additional configuration comprises the following alternative configurations: a second configuration wherein the second block is in the active state and the first block in the reset state, and a third configuration wherein the first block assumes the active state and the second block assumes the reset state.

37. (New) The method according to claim 35, wherein at least one of said first and second output signals has a polarisation state that is variable between all the possible states of polarisation.

38. (New) The method according to claim 35, further comprising the steps of:
reaching a limit value by at least one regulating signal of one of said blocks; and
generating at least one regulating-reset signal for bringing one of said blocks, for which the reaching of the limit value has occurred, into the reset state.

39. (New) The method according to claim 38, further comprising the steps of:
completing said rewind operation for one of said blocks which has assumed the reset state; and

generating at least one regulating-deactivation signal in order to bring one of said blocks from the reset state into the inactive state.

40. (New) The method according to claim 35, comprising one of the following steps:

transforming the input signal into the second output signal by carrying out any-to-any type polarisation transformations;

transforming the input signal into the second output signal by carrying out any-to-fix type polarisation transformations; or

transforming the input signal into the second output signal by carrying out fix-to-any type polarisation transformations.

41. (New) The method according to claim 35, comprising the steps of:
generating a feedback signal starting from the second output signal; and
processing said feedback signal and generating the regulating signals to be fed to said blocks.

42. (New) The method according to claim 41, comprising a measurement step, carried out on the basis of an optical feedback signal which is dependent on said second output signal, the measurement step returning the feedback signal correlated with a quantity which is associated with the optical feedback signal.

43. (New) The method according to claim 42, wherein said quantity is an optical power associated with the optical feedback signal and comprising a generation step of the regulating signals in such a manner as to control said optical power.

44. (New) The method according to claim 43, additionally comprising generation steps of the dithering type regulating signals for inducing variations in said polarisation transformations carried out by one of said blocks in the active state.

45. (New) A polarisation control device, comprising:
a first adjustable block for transforming the polarisation of an optical input signal and providing a corresponding first optical output signal;

a second adjustable block distinct from the first block for receiving the first output signal as input and transforming the polarisation of the signal, thus providing a corresponding second optical output signal;

a control stage for providing to said blocks regulating signals varying between limited operating intervals, adapted to bringing the device into the following alternative configurations:

at least one configuration wherein one block between said first and second blocks, assumes an active state in which said configuration performs a polarisation transformation that is variable over time, and the other block assumes an inactive state in which the configuration carries out a polarisation transformation, that is substantially constant over time, or

at least one additional configuration wherein, one block between said first and the second blocks is in the active state and the other block is in a reset state wherein at least one of the corresponding regulating signals is induced by the control stage to assume a value within said limited interval.

46. (New) The device according to claim 45, wherein:

said at least one configuration comprises the following alternative configurations: a first configuration wherein the first block assumes the active state and the second block assumes the inactive state, and a second configuration wherein the first block assumes the inactive state and the second block assumes the active state;

said at least one additional configuration comprises the following alternative configurations: a second configuration wherein the second block is in the active state

and the first block is in the reset state, and a third configuration wherein the first block assumes the active state and the second block assumes the reset state.

47. (New) The device according to claim 45, wherein said blocks are such as to carry out polarisation transformations such that at least one out of said first and second output signals has a polarisation that is variable between all the possible states of polarisation.

48. (New) The device according to claim 45, wherein said control stage is such as to generate at least one regulating-reset signal for bringing one of said blocks into the reset state following the reaching, by one of the corresponding regulating signals, of a limit value of its own operating interval.

49. (New) The device according to claim 45, wherein at least one of said first and second blocks is realised according to one of the following typologies: any-to-any, fix-to-any, or any-to-fix.

50. (New) The device according to claim 49, wherein said first and said second blocks are of the any-to-any type, such that the first and the second blocks may accomplish any-to-any type overall polarisation transformations.

51. (New) The device according to claim 49, wherein said first block is of the fix-to-any type and said second block is of the any-to-any type, in such a manner that the first and the second blocks may accomplish fix-to-any type overall polarisation transformations.

52. (New) The device according to claim 49, wherein said first block is of the any-to-any type and said second block is of the any-to-fix type, in such a manner that

the first and the second blocks may accomplish any-to-fix type overall polarisation transformations.

53. (New) The device according to claim 45, wherein the first and the second blocks respectively, comprise a first and a second plurality of optical polarisation conversion elements.

54. (New) The device according to claim 53, wherein said first and said second pluralities comprise at least one corresponding first optical element having a fixed principal birefringence axis and a birefringence that is variable on the basis of a corresponding first regulating signal generated by said control stage.

55. (New) The device according to claim 54, wherein said at least first optical element is a fibre optic squeezer.

56. (New) The device according to claim 54, wherein said at least first optical element is a liquid crystal element.

57. (New) The device according to claim 53, wherein at least one of said first and said second pluralities comprises at least one second optical element having birefringence and having a principal birefringence axis that is variable on the basis of a corresponding second regulating signal generated by said control stage.

58. (New) A controlled polarisation system comprising:
a polarisation controller device according to claim 45,
a polarisation sensitive device provided with:
an optical input port for receiving the second output signal;
an optical output port for making available an output signal having a polarisation state that is dependent on said second output signal; and

an optical feedback port for making available an optical feedback signal having a polarisation state which is dependent on said second output signal.

59. (New) The system according to claim 58, wherein said control stage comprises a processing unit such as to process electrical signals obtained from said optical feedback signal for generating the regulating signals.

60. (New) The system according to claim 59, further comprising a measuring device for receiving the optical feedback signal and providing an electrical feedback signal to be fed to the control stage, and correlated with a quantity associated with the optical feedback signal.

61. (New) The system according to claim 60, wherein said quantity is the power associated with the optical feedback signal and said control stage generates regulating signals in such a manner as to maximise the optical power of the emerging signal present over said optical output port.

62. (New) The system according to claim 60, wherein said measuring device comprises a photo-detector for converting the optical feedback signal into a corresponding electrical signal.

63. (New) The system according to claim 58, wherein said polarisation sensitive device comprises a polarisation beam splitter optically coupled to said optical input port and having two outputs optically coupled to the optical output port and to the optical feedback port.

64. (New) The system according to claim 58, wherein said polarisation sensitive device comprises a polariser which is optically coupled to the optical input port

and such as to transmit a selected part of the second output signal having preset polarisation over a corresponding output.

65. (New) The system according to claim 64, further comprising a first optical coupler, comprising a corresponding input such as to receive said selected part and send a portion of said selected part over a first output optically coupled to the optical feedback port and a corresponding second output optically coupled to the optical output port.

66. (New) The system according to claim 58, such as to carry out coherent reception, and wherein said polarisation sensitive device comprises a second optical coupler provided with:

an additional input port in order to receive a local optical signal; and
a common output to which the local optical signal and the second output signal are sent in such a manner as to obtain a resultant optical signal which is dependent on the state of polarisation of said second output signal, said common output being optically coupled to the optical output port and to the optical feedback port.

67. (New) The system according to claim 60, such as to perform compensation for polarisation mode dispersion and wherein said polarisation sensitive device comprises a high birefringence fibre in which the second optical output signal is propagated, and said measuring device comprises a device which is able to provide an electrical feedback signal which is representative of the distortion of the second optical signal which is propagated within said fibre.